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# **USAF Hearing Conservation Program, DOEHRS-HC Data Repository Annual Report: CY15**



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## 1.0 SUMMARY

The U.S. Air Force School (USAF) of Aerospace Medicine, Epidemiology Consult Service Division, Operations Support Branch, Hearing Conservation Program (HCP) Management Office prepares an annual status report on the USAF HCP in accordance with Air Force and Department of Defense Instructions. The purpose of this report is to provide a corporate view of the status of the USAF HCP with data reported from the Defense Occupational and Environmental Health Readiness System-Hearing Conservation Data Repository (DOEHRS-HC DR). Major command- and installation-level reports are available quarterly and by request from the Operations Support Branch, as well as from those who have user-defined roles in the Data Repository. This report covers information regarding software implementation status, HCP effectiveness metrics, to include an overview of a few standard reports currently available in the DOEHRS-HC DR database, and recommendations for major command public health and installation HCP managers.

## 2.0 INTRODUCTION

The U.S. Air Force School of Aerospace Medicine, Epidemiology Consult Service Division, Operations Support Branch, Hearing Conservation Program (HCP) Management Office (USAFSAM/PHR) prepares an annual status report on the USAF HCP in accordance with Air Force Instruction (AFI) 48-127, *Occupational Noise and Hearing Conservation Program*, Section 2.9.2.17 [1] and Department of Defense Instruction (DoDI) 6055.12, *Hearing Conservation Program* [2]. This report covers calendar year 2015 (CY15).

The purpose of this report is to provide a corporate view of the status of the USAF HCP with data reported from the DOEHRS-HC DR, as well as the functionality of the DOEHRS-HC DR and how it affects the USAF HCP. Major command- (MAJCOM) and installation-level reports are available quarterly and by request from USAFSAM/PHR. This report covers information regarding software implementation status, CY12-CY15 HCP effectiveness metrics (including an overview of several standard reports currently available in the DOEHRS-HC DR database), and recommendations for MAJCOM public health and installation HCP managers (HCPMs).

## 3.0 DISCUSSION

### 3.1 DOEHRS-HC DR System

**3.1.1 Software Implementation Status.** During 2015, personnel from the DOEHRS Project Office and the functional representatives from each service participated in an Agile Defect Resolution event facilitated by the DOEHRS-HC DR vendor, NMR Consulting Inc. The event addressed DOEHRS-HC software versions 4.1.1.3 (7 Apr 2015), 4.1.1.4 (28 Apr 2015), 4.1.2.0 (20 Oct 2015), and 4.1.2.1 (10 Nov 2015). Detailed information regarding features added, defects corrected, and known defects still unresolved is documented in each software version's "Release Notes" and can be viewed at <https://doehrswww.apgea.army.mil/>.

Version 4.1.1.3 provided enhancements and defect resolution to include correction of the audiometer calibration date, making it blank by default. New enhancements of this version included removing the creation of default listener from the initial daily calibration, adding

support for joint installations, updating the service duty occupation code matching to four characters for United States Navy enlisted, and hiding the menu options for HCPM United States Army and HCPM USAF.

Version 4.1.1.4 corrected the calculation of significant threshold shift (STS) to reflect the applicable method for the timeframe of the audiogram. For example, the examiner can now manually enter a hearing test dated 2003 that uses the 2003 method of STS calculation and not current day methods.

Version 4.1.2.0 included three new features that addressed the following System Change Requests (SCRs):

1. SCR 4345 (Updated HC Download Page): Allows users with an Import/Export role to access a menu item called Downloads, allowing them to perform a manual upload and lookup table update with instructions.
2. SCR 4375 (Allowed DOEHRS-HC DR HCEDIT Users to Edit DR Inquired Records in DOEHRS-HC): Allows users with the “HCEDIT” role to edit all tests in their database and all inquired tests to ensure the accuracy of DOEHRS-HC DR audiogram data.
3. SCR 4394 (Updated Installation List to Mark Inactive/Closed Sites): Allows users who are “functional reps” and HCPMs who enter Denominator Data the ability to visually distinguish active and inactive installations while adding records. Multiple System Incident Reports and SCRs were corrected with this version; specific details can be found in the Release Notes for version 4.1.2.0.

Version 4.1.2.1 did not address new functional requirements but corrected the DOEHRS-HC DR system degradation related to database query performance from security mandate enhancements. This allows the user to perform normal activities and successful inquiries within the DOEHRS-HC DR without a significant delay.

**3.1.2 Data Repository Status.** During 2015, base-level information systems units began upgrading USAF computer systems from 32-bit to a 64-bit functionality to facilitate the transition to Windows 10 as the standard USAF operating system. However, the DOEHRS-HC DR software in CY15 was only compatible with 32-bit systems. Several Air National Guard (ANG) installations experienced work stoppages due to this switch in functionality. USAF HCP functional representatives and public health leadership created a memorandum that was distributed service-wide to prevent units from making this transition. All active duty USAF public health offices and Guard/Reserve units were directed to stay with a 32-bit operating system and continue using Windows 7 until further instruction.

**3.1.3 CY14 Data Errors.** In CY14, significant errors in DOEHRS-DR HC data counts occurred, resulting in some tests being counted multiple times for multiple HCP reports. Maintenance Change Requests 5258 and 5247 were entered to correct this counting error, subsequently fixing the error in March 2015. Due to this error, CY14 data presented in the CY15 summary report are significantly different from CY14 data presented in the CY14 summary report. For example, the CY14 summary report on STS rates shows 295,089 periodic audiograms for military members in CY14, which is the total number reported in the DOEHRS-HC DR prior to fixing the multiple count error. The CY15 report shows 147,807 in CY14, the accurate number of periodic exams for military members after the error was fixed.



## 3.2 HCP Effectiveness Metrics

**3.2.1 Accession Audiograms.** Beginning in CY15, the USAF implemented baseline testing for all new accessions entering the service through Maxwell Air Force Base (AFB) (officers) and Lackland AFB (enlisted). Although personnel were not enrolled in the HCP, the accession exam test results were recorded as a reference audiogram on form DD2215 and populated into DOEHRS-HC DR reports, which skewed HCP-specific reports such as compliance reports. For example, an Air Education & Training Command (AETC) HCP compliance report showed a military compliance rate of approximately 390%, as 35,502 members received a reference audiogram; however, only 8,600 were actually enrolled in the HCP for AETC. Because of this error, compliance data (Table 1) were filtered to remove reference exams performed at the 559<sup>th</sup> Trainee Health Squadron, Lackland AFB, and at Maxwell Officer Training, Maxwell AFB. The total number of records removed was 23,676. Personnel who enrolled in a HCP after basic military training received a subsequent hearing exam upon reporting to their first duty station and were captured in the overall HCP metrics of STS and compliance (Tables 1-3).

**3.2.2 Program Compliance.** HCP compliance is defined as the number of people who received their annual hearing exam (numerator data) divided by the number of members enrolled in the HCP (denominator data). Numerator data were collected from the DOEHRS-HC DR and denominator data were obtained from the Aeromedical Services Information Management System (ASIMS). The denominator data obtained from ASIMS reflect a snapshot of those enrolled in the HCP at the end of CY15 and do not reflect the variation of personnel on the HCP over the calendar year. Table 1 represents the compliance data for the USAF for CY12-CY15. The CY14 and CY15 compliance rates were over 100%, indicating more individuals received annual audiograms than were reported enrolled in the HCP.

One possible reason for this discrepancy is the timing of the data request. The numerator data from DOEHRS-HC DR contain all unique Social Security numbers of individuals who received an annual audiogram during the entire calendar year minus those records from the 559<sup>th</sup> Trainee Health Squadron, Lackland AFB, and Maxwell Officer Training, Maxwell AFB. However, the denominator from ASIMS would not reflect personnel who were terminated from the HCP prior to the data query, resulting in a compliance rate of over 100%. In addition, base-level errors (i.e., administering annual audiograms instead of non-HCP audiograms for individuals who were not actually on the HCP) can increase the size of the numerator and further contribute to a higher compliance rate.

**Table 1. Compliance Rates, CY12-CY15**

<b>Year</b>	<b>Category</b>	<b>No. Noise Exposed</b>	<b>No. People Tested</b>	<b>Compliance Rate (%)</b>
CY15	Military	150,727	160,844	106.71
	Civilian	33,130	24,018	72.49
	<b>Total</b>	<b>183,857</b>	<b>184,862</b>	<b>100.54</b>
CY14	Military	159,180	169,931	106.75
	Civilian	27,291	23,999	87.93
	<b>Total</b>	<b>186,471</b>	<b>194,847</b>	<b>104.49</b>
CY13	Military	170,369	165,467	97.12
	Civilian	27,704	24,675	89.07
	<b>Total</b>	<b>198,073</b>	<b>190,142</b>	<b>95.99</b>
CY12	Military	183,249	157,877	86.15
	Civilian	28,749	25,863	89.96
	<b>Total</b>	<b>211,998</b>	<b>183,740</b>	<b>86.67</b>

**3.2.3 Threshold Shift Trends.** The key metric for any HCP is the STS as specified in DoDI 6055.12 [2] and AFI 48-127 [1]. STS comprises permanent threshold shifts (PTSs) and temporary threshold shifts (TTSs). PTS is defined as any STS that persists after the follow-up audiograms are completed and is a measure of permanent change in hearing. TTS is defined as any STS that resolves after the follow-up audiograms. TTS is a temporary loss of hearing, often due to hazardous noise exposure, and should be used as an opportunity to target intervention efforts for engineering controls, administrative controls, and effective use of hearing protective devices. While PTSs can be due to hazardous noise exposure, other factors such as disease or trauma can cause permanent hearing changes as well. Care is necessary when reviewing STS rates. For DOEHRs-HC DR purposes, TTS and PTS rates are directly influenced by the deadline for completing follow-up tests: 30 days for civilians and active duty military or 60 days for Reserve/Guard members. If follow-up tests are not completed by the respective deadline, DOEHRs-HC DR will permanently record the STS as a PTS, regardless if future follow-up testing was completed.

Table 2 represents the STS rates for CY12-CY15 broken down into military and civilian rates to determine if there are differences between these groups. A visual comparison of the data shows civilian STS rates to be higher than military rates every year. Overall, civilians in the HCP tend to be older than service members and may have more years of hazardous noise exposure. Working in hazardous noise environments for many years will negatively affect the auditory status of many workers, as damage to the inner ear accumulates over time. Table 3 displays STS rates for the 13 MAJCOMs for CY12-CY15.

**Table 2. STS Rates, CY12-CY15**

<b>Year</b>	<b>No. of Periodic Audiograms</b>	<b>STS (%)</b>	<b>TTS (%)</b>	<b>PTS (%)</b>
<b>CY15</b>				
Military	147,807	7.72	3.26	4.46
Civilian	22,370	18.55	6.25	12.30
<b>CY14</b>				
Military	155,060	7.24	2.85	4.39
Civilian	23,024	14.52	5.52	9.01
<b>CY13</b>				
Military	143,255	6.57	2.62	3.95
Civilian	23,603	14.68	4.59	10.09
<b>CY12</b>				
Military	138,625	7.50	2.99	4.51
Civilian	25,195	10.00	4.56	10.44

**Table 3. STS Rates for MAJCOMs, CY12-CY15**

<b>MAJCOM</b>	<b>CY15 (%)</b>	<b>CY14 (%)</b>	<b>CY13 (%)</b>	<b>CY12 (%)</b>
ACC	7.22	6.79	5.42	6.84
AETC	11.72	7.38	8.12	9.21
AFDW	8.05	12.71	9.60	8.87
AFGSC	6.14	6.46	6.48	7.41
AFMC	11.88	9.74	9.02	9.33
AFRC	10.31	11.11	12.13	13.49
AFSOC	9.22	6.24	5.98	6.33
AFSPC	13.15	8.99	7.47	11.37
AMC	6.67	5.73	6.40	7.40
ANG	11.82	12.08	10.80	11.43
PACAF	6.51	6.23	6.51	7.83
USAFA	7.34	4.40	5.80	8.42
USAFE	5.55	4.14	4.17	5.75

ACC = Air Combat Command; AFDW = Air Force District of Washington; AFGSC = Air Force Global Strike Command; AFMC = Air Force Materiel Command; AFRC = Air Force Reserve Command; AFSOC = Air Force Special Operations Command; AFSPC = Air Force Space Command; AMC = Air Mobility Command; PACAF = Pacific Air Forces; USAFA = U.S. Air Force Academy; USAFE = U.S. Air Forces in Europe.

**3.2.4 Military Hearing Profiles.** Table 4 displays H-1, H-2, and H-3 profile levels for military members. The majority of personnel receiving audiograms demonstrated hearing thresholds within the H-1 profile; this finding is consistent with H-1 profile threshold requirements for military entrance processing. Over the course of time, individuals may experience changes in hearing, from a variety of occupational and non-occupational exposures, which can result in an H-2 or even an H-3 profile. The percentage of H-2 and H-3 profiles decreased from CY14 to CY15, while the percentage of H-1 increased for that period.

**Table 4. Military Hearing Profiles, CY12-CY15**

Year	No. of Personnel	H-1		H-2		≥ H-3	
		No.	%	No.	%	No.	%
CY15							
Enlisted	145,008	141,451	97.93	2,434	1.68	1,123	0.77
Officer	34,069	33,234	97.55	619	1.82	216	0.63
CY14							
Enlisted	125,743	119,742	95.23	4,051	3.22	1,950	1.55
Officer	34,021	32,457	95.40	1,095	3.22	469	1.38
CY13							
Enlisted	120,224	112,170	93.30	5,316	4.42	2,738	2.28
Officer	31,808	29,673	93.29	1,508	4.74	627	1.97
CY12							
Enlisted	115,512	107,418	92.99	5,363	4.64	2,731	2.36
Officer	30,810	28,668	93.05	1,474	4.78	668	2.17

## 4.0 RECOMMENDATIONS

The reports and metrics cited in this document reflect the data available in the DOEHRS-HC DR. Local HCP records may reflect a lower PTS rate due to individual record discrepancies between local DOEHRS-HC systems and DOEHRS DR. Certain types of PTS cases within the DR are related to the incorrect use of reference types at the local DOEHRS-HC system, as well as difficulties importing/exporting baselines older than 1998. The differences between the locally reported PTS rate and the PTS rate within the DOEHRS-HC DR continue to be identified by USAFSAM/PHR via quarterly records reviews. This effort is carried out for all active duty USAF DOEHRS-HC DR exporting locations and by request for the Reserve and ANG components. USAFSAM/PHR created a standardized STS tracker in Microsoft Excel to aid bases in recordkeeping of local STS rates and to improve data reporting to higher headquarters. The STS tracker tool is available for download at <https://kx2.afms.mil/kj/kx7/PublicHealth/Pages/content.aspx#/FH/OccHealth/HCP>.

Installation and MAJCOM public health personnel should continue to review their installation HCPs and compare the metrics given in this report with locally derived metrics. Further, installation HCPMs are given an installation-level report quarterly and MAJCOM public health personnel are given a quarterly MAJCOM Executive Summary Report of the HCPs within their MAJCOM. MAJCOMs can request access to the DOEHRS-HC DR to assess trends in their respective MAJCOM as needed. Questions regarding issues with DOEHRS-HC DR or the HCP

should be directed to USAFSAM/PHR, Operations Support Branch, HCP Management Office at [USAFSAM.PHR.HC.WPAFB@us.af.mil](mailto:USAFSAM.PHR.HC.WPAFB@us.af.mil).

## 5.0 REFERENCES

1. U.S. Air Force. Occupational noise and hearing conservation program. Washington (DC): Department of the Air Force; 2016. Air Force Instruction 48-127. [Accessed 1 Mar 2016]. Available from [http://static.e-publishing.af.mil/production/1/af\\_sg/publication/afi48-127/afi48-127.pdf](http://static.e-publishing.af.mil/production/1/af_sg/publication/afi48-127/afi48-127.pdf).
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## **LIST OF ABBREVIATIONS AND ACRONYMS**

<b>AETC</b>	Air Education & Training Command
<b>AFB</b>	Air Force Base
<b>AFI</b>	Air Force Instruction
<b>ANG</b>	Air National Guard
<b>ASIMS</b>	Aeromedical Services Information Management System
<b>CY</b>	Calendar Year
<b>DoDI</b>	Department of Defense Instruction
<b>DOEHRS-HC DR</b>	Defense Occupational and Environmental Health Readiness System- Hearing Conservation Data Repository
<b>HCP</b>	Hearing Conservation Program
<b>HCPM</b>	Hearing Conservation Program Manager
<b>MAJCOM</b>	Major Command
<b>PHR</b>	Epidemiology Consult Service Division
<b>PTS</b>	Permanent Threshold Shift
<b>SCR</b>	System Change Request
<b>STS</b>	Significant Threshold Shift
<b>TTS</b>	Temporary Threshold Shift
<b>USAF</b>	U.S. Air Force
<b>USAFSAM</b>	U.S. Air Force School of Aerospace Medicine